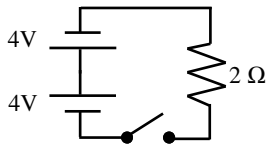
B-Day: Due Wed., Feb 10
A-Day: Due Thurs., Feb 11

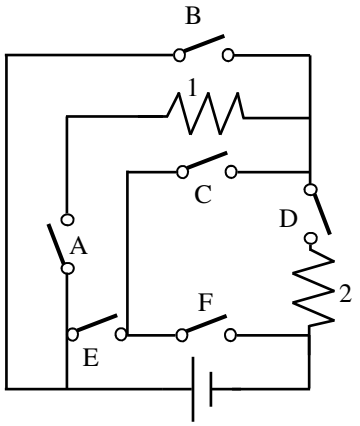
2010 Electricity 8

Name: _____

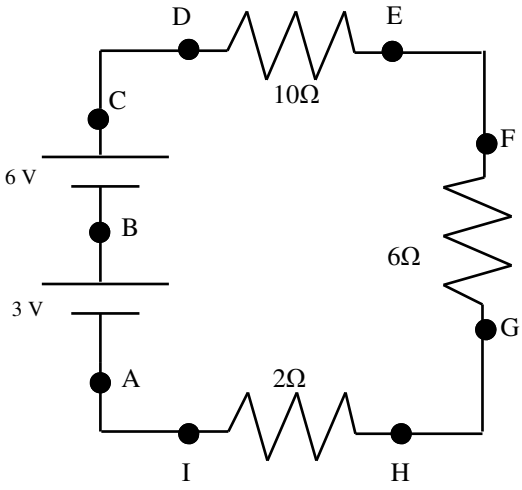


1. A. As drawn right now, is the above an open or closed circuit?
   B. With the switch is closed, what is the current in the circuit?

2. In the diagram at the right you will need to decide which switches to close to allow different situations. Start at the + side of the battery (the big side). This is like maze games—follow the path, but be sure you don't make a short-circuit.
   Which resistor or resistors allows:
   A) only resistor 1 to have current in it?
   B) only resistor 2 to have current thru it?
   C) to by-pass both resistors?
   D) for electricity to go thru both resistors?

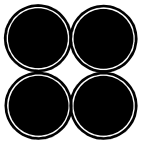


3. Work the circuit at the right and answer the following questions.
   A. Calculate the current flowing thru the circuit.
   B. If one of the resistors is removed, how will the current change?
   C. If a third battery is added to the circuit, how will the current change?
   D. How much current is flowing thru the 6Ω resistor?
   E. How much voltage is used by the 6Ω resistor?
   F. How much power is used by the 6Ω resistor?
   G. Calculate how much voltage is left at point E.
   H. How much power does the whole circuit use?



Using your lab notes or the "Types of Circuits" notes:

4. Series or parallel?
   A. ___ Only one path for the electricity to flow.
   B. ___ Paths are dependent on each other (*one affects the other*).
   C. ___ How your house is wired.
   D. ___ Paths are independent of each other.
   E. ____If one light turns off, the others stay on.
   F. ____If you turn off one light, all the lights turn off.
   G. ____Has more than one path for the electricity to flow.
   H. ____Two devices have the same current.
   I. ____Two devices have the same voltage.

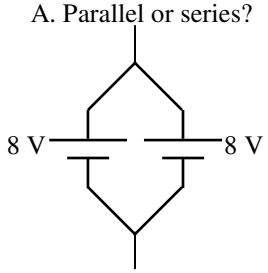


5. The holes at the left are pipes.
   A. Are the four holes in parallel or series, as shown?
   B. Together is there a bigger hole or a smaller hole for water to flow thru?
   C. Each pipe can allow 2 gal/sec, how much can flow thru them together?
   D. So, is the resistance increasing or decreasing?
   This is why 4 equal resistors in parallel are the same as a single resistor that is 1/4th as big.

6. Five 100Ω resistors are placed in a circuit.
   A. What is the total resistance if they are in series?
   B. What is the total resistance if they are in parallel?

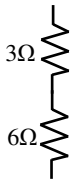
7. Decide if the following are in parallel or series and find the total voltage or total resistance.

A. Parallel or series?



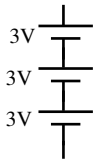
Vt = _____

B. Parallel or series?



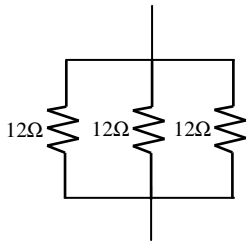
Rt = _____

C. Parallel or series?



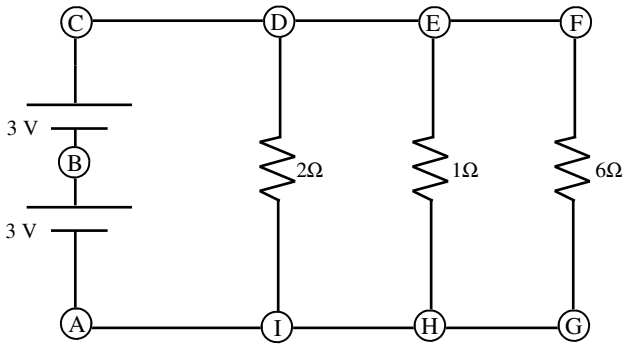
Vt = _____

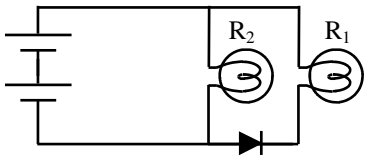
D. Parallel or series?



Rt = _____

8. After working the diagram, answer the following.
   A. If the 6Ω resistor is disconnected, how will it affect the 2Ω resistor?
   B. What is the voltage at point H?
   C. What is the voltage at point F?
   D. What is the voltage from point E to point H?
   E. Calculate the current in each branch.
   F. Which resistor has the most voltage across it?
   G. Which resistor has the most current running thru it?
   H. What is the current flowing from H to I?
   I. What is the total current of the circuit?
   J. How much power is used by the 6Ω resistor?
   K. How much power is used by the entire circuit?





From the Miscellaneous Circuits Lab:

9. Explain what a diode does in a circuit.

10. In the circuit at the left, R_1 isn't working. Without doing anything to the light bulbs, what is one change that would make R_1 turn on?

11. Remembering that 1 electron = -1.6×10^{-19}C… (see HW: "Electricity 1")
    A. How many electrons does it take to make a charge of 6.8μC?
    B. What is the charge of 8.5 electrons?

Taxonomy—how we name species.

Kingdom, Phylum, Class, Order, Family, Genus, Species
Most general *Most specific.*
Less related *More closely related*

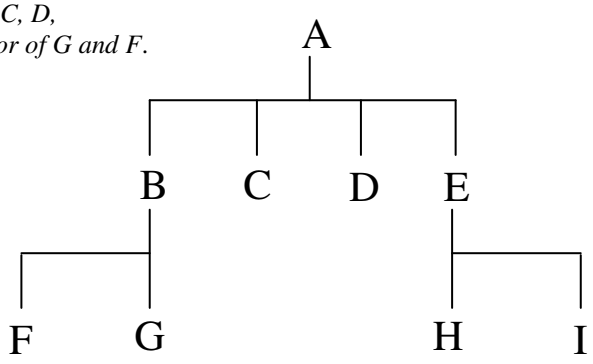
Scientific names: two parts; genus and species:
Ex: Human (*Homo sapiens*):
genus species

The farther to the right that the words are the same, the closer the species are:
Roses and Humans - different *Kingdoms*
Worms and Humans - different *Phylums*
Eagles and Humans – different *Classes*
Horses and Humans – different *Order*
Monkeys and Humans – different *Family*
Neanderthals and Humans – different *Species*
(but very closely related)

12. Which of the badgers below are most closely related?
A. North American Badgers – *Taxidea taxus*
B. Palawan Badger – *Mydaus marchei*
C. Eurasian Badgers – *Meles meles*
C. Javan Stink Badger – *Mydaus javanensis*

13. Which are more closely related: organisms of the same family or same class?

The diagram at the right shows represents a phylogenetic tree (a family tree). Each letter shows a different organism. Organism A is the ancestor of B, C, D, and E, meaning Organism A mutated into B thru E. Also, B is the ancestor of G and F.



14. Which is most related to G?

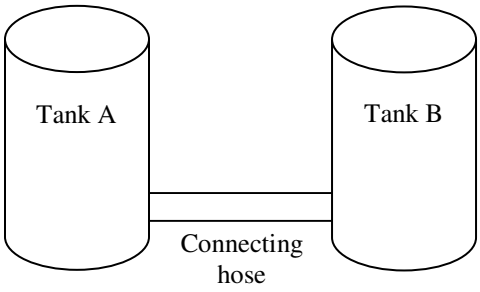
15. Which letter represents the organism that eventually mutated into all of the others?

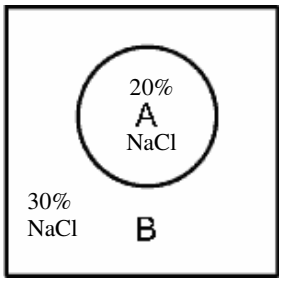
Diffusion—Movement of molecules from high to low concentration (how a smell spreads out around a room).
Osmosis—Movement of water thru a membrane from an area of high water concentration to low.
Semi-permeable—Allows some things thru, but not others (cell wall does this).

16. If Tank A is full of water and Tank B is empty, which way does the water flow?

17. If Tank A has a pressure of 20 pascals and Tank B has a pressure of 55 Pascals, which way does air flow?

Note: Almost ALL of nature works in such a way that thing move from high to low. Objects roll down hill (high to low). Air moves from high pressure to low pressure (like letting out a filled balloon).





18. A) In which region is there more table salt (by percent)?
B) In which region is there more water (by percent)?
C) If there is a semi-permeable membrane around A than allows only water to flow, does water flow from A to B or from B to A?
D) Over time, does A swell (get bigger) or shrink (get smaller)?
E) This flow of water is known as:

F) If the salt were moving, it would be known as d_____.

(*Note: This is why a fresh water fish (A) would die if placed in salt water (B). It would lose water and shrink.*)

	Kingdom	# of cells	Characteristics
Prokaryotes (no nucleus)	**Archeabacteria**	unicellular (1)	Live in extreme environments (very hot, no oxygen)
	Eubacteria	unicellular (1)	common bacteria, live on and around us/ some are beneficial (like in our stomachs).
Eukaryotes (with a nucleus)	**Plants**	multicellular	sexual or asexual/ don't move/ cell wall of cellulose/ true roots, stems, leaves/ Autotrophs (producer own food)
	Animals	multicellular	move/ sexual reproduction/ heterotrophs (eats other organisms)
	Fungi	mostly multicellular	sexual or asexual reproduction/ cell wall of chitin/ decomposers/ Heterotrophs or saprobes (digests outside of body)
	Protista	multi or uni	sexual or asexual reproduction/ animal or plant-like/ auto or heterotrophs/ no cellulose or true leaves or stems

19. Which kingdom (might be more than one)?
    A. Flat worms.
    B. Ferns.
    C. A bacteria that lives in a thermal vent at the bottom of the ocean.
    D. Made up of decomposers with a spongy cell wall.
    E. Makes there own food.
    F. Live with humans and help with digestion.